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Sutro
NANL

THE

BASIC LAW

—OF—

VOCAL UTTERANCE

—BY—

EMIL SUTRO

NEW YORK
108 EAST 16TH STREET
EDGAR S. WERNER
1894

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Press of Edgar S. Werner, 108 East 16th Street, New York,
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THE BASIC LAW

OF

VOCAL UTTERANCE.

PRELIMINARY REMARKS.

IT is not without a feeling of trepidation that I venture to write for publication on a subject with which so many eminent scientists have battled.

But I have a message to deliver, entrusted to me by the highest authority, that of nature itself, and I shall not shrink back from delivering it on account of a deficiency of information on some of the subjects intimately connected therewith.

For the same reason, however, I cannot claim that all my observations are likely to be in strict

conformity with established scientific facts, or supposed facts. I state only that which I *think* is the case, judging by the most conscientious, careful, and long-continued personal observations.

Had I called scientists to my aid, I might, in some instances, have been more correct, but would have lost my originality, which I claim for all my observations throughout. These observations, on the other hand, I firmly believe will open up new avenues in various directions for scientific research.

As far as the voice is concerned, they will mark an epoch in history. A new science will thereby be inaugurated, which will clear up the mystery which has surrounded it, and place its phenomena on a scientific basis.

This publication, in the first instance, is a simple recital of my experience in attempting to master, and in finally succeeding in mastering, the pronunciation of the English language.

I have carefully noted, step by step, how I drew gradually nearer to, and finally arrived at, this result. I have shown the way I have gone,

in language free from technicalities, so that all may be able to follow and arrive at the same result.

It sounds strange to relate, however, that on my way to apparently so simple an end, I should have encountered mines, filled with the most precious material ever found, for the knowledge of voice-production in general. This material revealed to me the hidden mechanism of the voice, not only of man's voice, but of the voice in general.

I can scarcely call it a discovery, for it was more in the nature of a revelation, that that should have come to me for which scientists of all civilized countries and of all ages have been searching in vain.

I was twenty years of age when I first came to this country,—an age at which the organs of speech have taken such positive shape for the production of the sounds of one's native tongue that it is difficult, nay, as I have since learned, next to impossible to dislodge them, and to produce to perfection those of the tongue of another country.

Being possessed of a fair book knowledge of the English language, I was also ambitious of learning to speak it precisely in the same manner that native born persons speak it. This idea took possession of me to such an extent that scarcely a day passed on which it was not uppermost in my mind.

How many years, from that time forward, I labored, trying to divest myself of my German accent in speaking English, I cannot tell, but there were a great many. Again and again I thought I had succeeded; and again and again always getting a better insight, I found I was still far from my cherished aim.

This continued till within some seven or eight years ago, when it suddenly dawned on my all but despairing mind that that which I had attempted was impossible of accomplishment. I became convinced that there were physical obstacles in the way, which it was not in my power to overcome.

With this knowledge once firmly settled, I abandoned my previous method of attempting to learn by imitation, which, by the bye, has

been everybody's method since time immemorial and, as far as I know, is everybody's method to this day, and commenced to learn by analyzation. I tried to resolve the English language, as far as its pronunciation was concerned, into its component parts, and by thus dissecting it ascertain how it was put together.

I cannot say that this thought was with me at first. But this is what it came to, after beginning with finding certain difficulties and overcoming them. Then overcoming more difficulties till, in the end, all the obstacles that had been in my way were removed, and I could produce perfect English speech. To be able to overcome these difficulties it was, of course, necessary to understand them. This was no easy task. It took years of thought and close observation before I could say I had come to the bottom of them.

I understood, as already remarked, English quite well before I came to this country, as far as reading and writing it went; and, in the course of time, I had also learned to speak it quite fluently. This *knowledge*, however, was

in my way, as it is in the way of all foreigners who understand the written language. The latter is always before their mind's eye, which makes their pronunciation so painfully exact and, therefore, so studiously incorrect.

Now, however, I commenced to learn speaking it over again; this time as a child does its mother-tongue. As I watched this child's progress I noticed each step, from the first helpless tottering of its limbs to their gradual growth in strength, till at last by their aid it could walk.

All studies in connection with the voice have been of a twofold nature: (1) To gain a knowledge of the instrument from which it emanates; and (2) to understand the nature of the result, the musical qualities of the voice. Very few, however, have made it their object to ascertain by what means the voice is evolved from its instrument. Unless we know how we play on our instrument, know what mechanical means are applied to draw sound from it, we cannot expect to better our mode of playing. All can play by gift of nature. But the question is, *how*

are they playing? The knowledge of the construction of the instrument, the larynx, on the one hand, and of the musical qualities of the voice, on the other, will not assist us in producing better results. It will not assist a foreigner in acquiring the correct speech of another land. It will not assist the teacher of elocution or of singing in developing his pupil's speech or song. It will not correct radical faults of enunciation, nor will it help the deaf and dumb in their struggles for expression, beyond their crude sounds of inharmonious speech.

Most works heretofore written do not contain much that one can take hold of and bend to one's will, so as to improve one's speech, song, or vocal utterance of any kind. Yet the will can do so much for us, if we only know just what we want it to do for us. It has been vouchsafed to me, by getting a better insight into the mechanical process by which speech is produced, to be able to show how improvements and good results can be obtained in a practical manner.

The observations I have made, beyond all others, are in connection with the air we use for speech; and with the movements of the tongue, the promoter and regulator of speech. Hence the word language, from *lingua*, tongue.

For years I have watched this delicate piece of mechanism, which is so constructed that it works without apparent effort, noise or friction. The person in whose body it exists, and by whose will it is set in motion, is scarcely aware that there is any action at all, although it is making countless noiseless movements within him. It is ever ready to do the bidding of its master, the mind; and its fatigue must be great, indeed, or its illness severe, before it will show any sign of disobedience.

I looked into the workshop of the mouth to ascertain why, after its machinery had enabled me successfully to produce German speech, it so obstinately refused to lend its aid in doing the same for me in the production of English speech. The impediments I had encountered, and which I was trying to overcome, were now of the greatest aid to me; inasmuch as they enabled

me to feel my way along the lines in which this delicate yet most lively piece of mechanism, the tongue, was moving. I could not have done this for my own language, nor could the native born of any country have done it for his. It was by making a comparative study of mine with a foreign tongue alone which enabled me to accomplish this.

There being no difficulties to overcome, the machinery moves with such perfection for one's own language that its movements, partly on account of their rapidity, partly because they are involuntary, cannot be watched. They have been working thus from our infancy, and, being hidden within the inner recess of our mouth, do not offer us an opportunity of observing them.

My tongue, however, was overweighted. It halted, and made an effort, when it tried to produce these, to it, strange and abnormal sounds. This gave me the opportunity of watching it, and finding out by what means it finally succeeded in producing these sounds. No physician, leaning his ear against the breast of his patient, ever listened more intently than I

listened to the sounds of my voice. With an acute ear for sounds, and knowing just what was expected of me, I never stopped trying till, in guiding my tongue, now hither, now thither, I finally hit upon the correct sound.

While I do not know, to-day, how my tongue moves, except by induction, for German speech, I know precisely what movements it makes for the production of English sounds.

My advantage has been in this, that I could watch the machinery while it was in motion; whereas others have observed what there was to observe while it was standing still. By experimenting upon the larynx of the dead, or by thrusting an instrument into that of the living, how can it be expected that any reliable movements should have been observed? For it is action, action all the time that is doing the work. So many agents have to coöperate in the living body to produce correct results that the default of any one of them will suffice in neutralizing the proper action of the rest.

It is by watching the obstructed action of our organs that we can expect to be able to obtain

correct results. I feel satisfied, that with extreme care and watchfulness the same as I have exercised in connection with our organs of speech, correct results can often be obtained where now vivisection is resorted to.

I do not by any means wish to say, however, that I consider my work to be complete. The light by the aid of which I have obtained a glimpse of the silent workshop in which the tongue is moving has been but a dim one at best, yet it has revealed enough to show the way; and those better prepared, by their scientific and musical knowledge, can now pursue it on further toward greater perfection.

I have been both my teacher and my scholar, and there never has been a more patient teacher or a more industrious scholar. During long and tedious rides in the street-cars which I was daily obliged to make, this scholar was my constant companion. During the silent hours of the night when sleep would not come, he was lying awake with me, listening to me, and trying to obey my most dictatorial commands. I have been pleased with his industry and his

progress, and that is saying a great deal, for I am a most exacting taskmaster.

It is this advantage that my method has, that the principle, once understood, we can carry an entire dictionary with us in our heads, and be constantly learning the pronunciation of the words, at any time and upon every occasion. We can practice singing in the same way, not aloud, but in an undertone sufficiently distinct, however, to make us feel whether we are correct or not.

Mine is the natural method of learning to speak a language; others are by imitation only. Where a solid foundation is wanting, there cannot be a satisfactory edifice. Mine is the solid foundation; that of others, a very unsatisfactory structure without foundation in principle.

German-English dictionaries generally use German characters to give the English pronunciation. This is very misleading, there being no equivalent for German sounds in the English language, as they are different both in their origin and in their nature.

Anyone in the least acquainted with the

true pronunciation will know that the same is far from being correct, when hot is represented by "hat;" when pale is spelled "pehl;" village, "villedsch;" her, "hörr;" busy, "bizsi;" clothes, "kloss;" whose, "huss;" whole, "hohl;" voice, "vauzs;" who, "huh;" wrestle, "ross'l;" German, "dschörman;" suggest, "sogdschesst;" anxious, "ahnkschöss;" etc.

But why continue when it is impossible *exactly* to render one word, even the simplest, by any sign or letter in the German language?

I have taken the preceding at random from a key to the correct pronunciation of English, contained in one of the best guides in existence, and but lately published. Others are worse; some of them actually bordering on the ridiculous. Still the above rendering probably comes as near to the solution aimed at as the German language is capable of. In this or a similar manner Germans and other foreigners are taught to pronounce English wherever their countrymen teach it, and it is rare that, outside

of the countries in which English is spoken, anyone else teaches it.

Everyone who has been taught to speak English in this imitative manner must again unlearn it, before he can begin to speak it correctly. Teachers, above all, should study these fundamental principles, and possess themselves of an "English tongue," without which it is impossible to teach the correct pronunciation.

Germans learning English with a German tongue, must twist their tongues into all manner of unnatural shapes while attempting to produce these, to them, strange and abnormal sounds. A language to be well spoken must be spoken with ease, in a natural manner, and without an effort, and this can be done only when the same *mechanical* means are employed that are used by native-born persons.

It will be objected that it is just my system which requires one's tongue to be twisted in an unnatural manner. I can only reply that, if this is so, it is not done at haphazard, but according to principles, and for the purpose of bringing about correct results. Once accom-

plished, it soon becomes natural and requires no further effort. With a child whose organs of speech are still plastic, no effort is required to speak a foreign language. Its instinct will lead it into the right path at once, and its organs of speech offer no obstacles that cannot be readily overcome. These organs, once having assumed shape in a definite direction, however, largely dictated by habit, it becomes a matter of considerable difficulty to give them shape in another direction. This is greatly aggravated in case of a default of the knowledge of the action really required of them. This knowledge I propose to supply, having made a careful study of the mechanical means employed in producing both the German and the English languages.

While my studies have been confined to these languages, there is no reason to doubt but similar results might be obtained in respect to any other language. So that, in the end, the pronunciation of all languages could be taught according to the natural method. It is easier for an English-speaking person, however, to learn German than it is for a German to learn Eng-

lish; if it were but for the reason that each letter in German represents a given sound, while English vowel sounds, as represented by letters, are a very uncertain quantity, indeed.

The mechanical difficulties a German has to overcome in speaking English, an English-speaking person, of course, must acquire in order to enable him to speak German correctly.

Understanding the mechanical requirements for the correct pronunciation of English, I have carefully applied them to my speech; and I seriously doubt whether there ever has been another person who has learned to speak a language in a similar manner to that in which I have learned to speak English.

Our native tongue is part and parcel of our being. It is so intangible that we cannot grasp it and lay hold of it for the purpose of dissecting it. What I have done for the English language, therefore, I never could have done for my own.

It is not without reason, therefore, that people are named for the language they speak: Germans, Frenchmen, Englishmen, Dutchmen,

etc. They retain this cognomen even after they have left the country of their birth and have become citizens of another. Their language is synonymous with their being, and they cannot dispossess themselves of it and possess themselves of another to the same perfect degree, any more than they can change the features of their face.

Even after my system shall be perfectly understood, it will be given to but comparatively few to learn to speak a foreign tongue with the same perfect ease that they do their own. It is no more likely, then, that the popular fancy, that English will some day become the language of the world, will be realized, than that Ethiopians or Mongolians will eventually become identified with the Caucasian race.

Before closing these remarks and entering upon my theme proper, I beg to be permitted to say that I have been obliged so frequently to use the terms "English-speaking people," or "Englishmen," and "Americans," to which, to be quite correct, should be added "Canadians," "Australasians," "East Indians," etc.,

that I have substituted therefor the word "Anglicans," as representative of people who speak the English language. This word I shall make use of hereafter.

I also want to say that, regarding the pronunciation of the English language or peculiarities connected therewith, I have reference only to the manner in which it is spoken in this country.

Unless the German language is specially mentioned, every remark has reference to the English language only. I also beg to say, that whatever merit, or demerit also, may belong to the contents of this publication, they are originally mine, having consulted no person, or work, in connection therewith. It was only after my system had assumed the shape in which it appears now, that I looked up some of the authorities; but I have not found that anyone has pursued the same course of studies that I have.

If there are repetitions in this little book, I must be forgiven for them. They are not inserted to swell its volume, but to make my

meaning more clear. They are not repetitions, however, in a literal sense; but, like the facets of a diamond, which show its value from different points of view, or like the photograph of a beloved face which has been taken from various standpoints, each giving the same general features—they throw light on my subject from different sides, revealing, I hope, new features and new points of interest in every instance.

Finally, I want to add to what I have already said in the beginning, that this is not a scientific book in the strict sense of the word. I am a simple citizen, and not only give my experience and whatever knowledge I may possess, but also take the reader into my confidence in regard to my suppositions, my thoughts, and my feelings even in the most unscientific and unconventional manner.

As I owe no debt to anyone, except to those who may take the trouble to read this book, I hope they will forgive me for the manner in which I am dealing with my subject, and with them; and I also hope that I shall not be held to account too strictly for any faults of fact or of judgment.

BREATHING.

IT has always been believed, and, so far as I know, it is still generally believed, that the air, or "breath," we use for our speech is drawn from our lungs; that the air we inhale into our lungs through our nose or mouth, during the act of expiration furnishes the motive power for our speech.

I have ascertained that breathing through the nose, for the purpose of supplying our lungs with life-giving air, or occasionally through the mouth for the same purpose, is a distinctly different proceeding from the one by which our organs of speech are furnished with air for the production of sound. *Breathing for speech is carried on through our mouth while we are in the act of speaking.* Even for nasal sounds we draw on the breath inhaled through the mouth, and do not interfere with that which is inhaled through the nose, all of which goes to supply our lungs.

If this were not the case, the vital function of supplying our lungs with fresh air would be constantly interfered with, through our speech. The same would cause a pause, be it ever so short, in expiration; consequently, a similar pause would arise between the previous and the next inspiration. Breathing, in consequence, during speech would be a very unreliable factor.

There is no connection between the two, however, each performing its function without any reference to the other, and without interfering with each other.

It seems strange, yet it is no doubt true, that while we are in the act of speaking breathing through the nose is carried on as regularly as it is in our sleep. While the act of breathing for our lungs is regular and measured, generally long drawn out, breathing for speech is irregular, generally short, and is subject to the requirements of all the whims and fancies of language.

In breathing for speech we take in just enough air for the production of any one given sound. If there is to be an emphasis, an additional vol-

ume of air is absorbed to produce this emphasis. If a sound is to be spoken low, the volume of air will be correspondingly small.

It appears to me that the air we use for speech never enters our lungs; but, being inhaled and exhaled, respectively, for the special purpose of producing sound only, it simply supplies the organs of speech with the necessary air to produce sound, the same volume of air inhaled for speech being also exhaled for this purpose.

In breathing for the lungs, in like manner, the same volume of air which is inhaled into the same is also exhaled from the same. In teaching correct breathing for speech or song, therefore, care must be taken to do so for the breath we inhale through the mouth for the production of sound, and not for that which we inspire for the lungs.

It is popularly believed that speech is carried on by a continuous "stream" of air coming from the lungs; or that a large volume is inhaled into the lungs and kept there as a reservoir, from which to draw for speech or song. If it were a "stream," and part of it were used for

speech, causing a disturbance in respiration, how could there be a "constant" stream? The inspiration, as well as the expiration, would be a "perturbed" stream, at best. If it were a "reservoir" holding enough air to carry one through a speech or a song, the lungs would soon be in a sorry plight for want of fresh air, as that which remains in the "reservoir" after the first few notes would be deprived of its oxygen, and the speaker or singer would drop down dead before he could finish his speech or song.

If, on the other hand, one should stop every time the necessity arose for replenishing "it" with fresh air, there would be constant interruption in our utterances, and no continued flow of sound would be possible. That which is exhaled for speech, consequently, must have been previously inhaled for speech, and for that purpose only. The same as that which is exhaled from our lungs must have been previously inhaled into our lungs, and for their benefit only.

It does not seem reasonable, furthermore, to suppose that the air, after having been deprived

of its main component part, should be used in its vitiated form to produce sound. Nor does it seem reasonable that it should not be expelled from the body, after having thus been used in the shortest time, or in the most direct manner possible.

How the two streams of air are kept separate, while using one and the same channel, is to be explained in this manner: that the air we use for speech, having a greater velocity than that which we inhale into our lungs, its rapidity of motion enables it to pass the other "bodily," without interfering with it or being interfered with by it. Its motion must, of necessity, be rapid to enable it to produce sound. Even for the production of the weakest sounds, its rapidity is greater than that which with a sluggish motion is inhaled and exhaled respectively for the lungs. The air we use for speech is of that same meteoric kind that sparks are when we stir the fire in a grate. It bears the same relation to the air we breathe for our lungs that these sparks do to the fire. Their velocity and density are far greater, while their duration is

but for the moment. Even with these air-sparks, however, there is a difference as to these qualities,—velocity, volume, and duration,—the same being regulated by those which we desire the sounds we are about to produce to possess.

The voice may be likened to a string-instrument. Others have, perhaps, more accurately, in some respects, likened it to a reed-instrument; but a string-instrument will better illustrate my idea. The separate streams of air we inspire and expire respectively for the production of sounds are, in many respects, of the same order that strings are in a string-instrument. They differ in thickness and in length; and the waves of air they set in motion differ in volume and rapidity. Some of them reach down as far as it is possible for them to reach, while some are of medium and others of short length. Hence we say, sounds come from the stomach, the breast, or the head; each expression representing a different *length* of string of air or of sound. But they are not positive, nor stationary. They come and they go; they lengthen and they shorten; they swell to mighty dimensions, or

they disappear altogether; not suddenly, but slowly and by degrees, as their ruler, the mind, may command.

As the master of a musical instrument represents his emotions by the sounds he draws from its strings, so will the singer or the speaker draw the music lingering in his soul out of these living strings. Through them others speak to our hearts, or in other moods overpower us with grief, or fill us with anger. At times the "strings" suddenly contract, at other times they expand almost ready to burst. Sometimes, they are filled with a soft, elastic fluid, and again they may be as dry as a cinder. They are suspended from our hearts and our souls, whose throbbings, longings and thoughts they interpret to ourselves and to others.

After giving an account of these air or sound strings or cords, the question still remains to be answered: How do they originate? What gives these streams of air this power, this velocity with which, by forcing their way through narrowed passages, they produce sound? What is the power which enables birds and insects to

produce sounds apparently far beyond their physical strength ?

The answer is, that the sounds do not originate within ourselves, but beyond us. They have their origin in the air which surrounds all beings,—man, birds and insects.

By creating a vacuum in the air-channels, through expiration, the exterior air is forcibly drawn into them. By our minds working on our will-power, the latter, by the aid of said vacuum, creates a draught, an exterior stream of air which is set in motion toward the oral cavity. This exterior draught possesses already in a manner the necessary qualifications for the production of the sound which the singer's or speaker's mind intended to create.

In ordinary speech this is a proceeding which is altogether automatic; but in speech produced artistically, such as oratory, or song, especially in the latter, the mind anticipates the result.

It is inspiration, therefore, which gives the first impetus to sound, which is its creator, the cause; expiration is but the effect, the result. We must teach how to inspire correctly; correct

expiration will then follow as a matter of course.

It is in the great realm of air outside of the body where this force is created, not in the lungs, nor by a stream emanating therefrom, nor an accumulation of air therein.

There is, however, such a thing as air being "held" to give us the power of imparting additional force to sounds.

My assertion in the beginning of this chapter, "that the expired breath for speech equals the inspired breath for the same," will naturally provoke the question: How, then, is it that, after using our organs of speech for any length of time, we have to pause for breath, we are "short of breath?" The explanation is, that the greater volume of sound being originated by the outgoing voice, it is more than likely that we fail to inhale quite a sufficiency of air to produce with proper effect all the outgoing sounds we desire.

For this insufficiency we draw on the air which is "held" in the air-channels for this very purpose. When this air which is "held" becomes exhausted, or nearly so, we take in at

one gulp sufficient to supply the same again. This is the only "reservoir," and it but needs to be replenished at long intervals. It is quite possible, however (and I greatly incline to believe this to be so), that a person who breathes correctly (which very few persons do) might go on speaking or singing forever without "taking breath;" the only bar to his doing so arising from a fatigue of the muscles which move his tongue.

I have not in the preceding touched upon the action of the diaphragm, nor shall I attempt to do so now, except in saying that it does for speech what our lungs do for respiration, for the preservation of life. It forms a very important part of the machinery which expands and contracts for the admission and emission of air and sound respectively. It acts in conjunction with the motions of the upper and lower jaws and of the tongue.

For inspiration the upper jaw rises, together with the soft-palate and the uvula, but the tongue falls, and so does the diaphragm. This produces an extension of the upper cavity of the

mouth, upward and downward, and of the air-receptacles of the chest and stomach.

For expiration the lower jaw falls, while the tongue rises, increasing the size of the lower portion of the cavity of the mouth in both directions. The diaphragm rises, forcing out the air by contracting the receptacles which contained it.

All these actions are subject to great variations in connection with the special sound which is to be emitted. They may be slow or rapid, as to time; narrow or full, as to space; or there may be a combination of these actions. For instance, slow, yet narrow; quick, yet full; or slowly extending, quickly contracting; the action of the diaphragm being of a multifarious nature in bringing about these changes.

All this is regulated, in the first instance, by the sound we expect to create, and the manner in which we inhale for such sound. The object of all these actions is to create various openings, or to contract others, through which air can be forced to create sound; all these parts being those of a wind-instrument, and all these actions

means to bring these parts into such relation to each other as to create the widest range of openings and sounds, respectively, by passing various streams of air through the same.

Looking at the matter, herein before mentioned, from a mere mechanical or physical standpoint, "that two streams of air may pass each other in the same channel without interfering with each other, provided that there is a material difference in their velocity," I have mentioned it without reserve, although I am inclined to think that it is a discovery of no mean importance. It has already been established that two streams of the electric fluid can pass each other over the same wire without interfering with each other; and so can two streams of air through the same orifice, as illustrated by the air we use for speech and by the air we inhale for the lungs. This may lead to the construction of a new order of wind instruments, possessing different scales of sounds which can be played at the same time, or it may be utilized in other directions.

HOW DO WE SPEAK?

THE manner in which we breathe for speech is by raising and lowering the tongue.

For each sound we utter the tongue must be once raised and once lowered, at least. These movements follow each other in regular rotation, the tongue being raised, then lowered, then raised again, although they are sometimes of so slight a nature that they scarcely can be perceived. They never cease during the continuation of speech; and with each one of them the air is either admitted or emitted.

These motions of the tongue are accompanied by corresponding motions of the lips, which, while we are speaking, seem to be in a constant quiver. The motions of the lips are apparently without regularity; though the same as the tongue's they in reality change from the upper to the lower with never-failing regularity. The movement is now of the lower lip, then of the upper, and again of the lower, etc., though it

is not often of the same period of time. As the tongue is raised, there is a movement of the lower lip; as it is lowered, there is one of the upper lip.

These movements of the lips correspond with the movements of the jaws, which again superinduce those of the tongue. They are sometimes short, scarcely showing the teeth; sometimes so as to show an entire row of teeth; either the upper or lower, in accordance with the requirements of the sound which is being uttered.

For English speech the tongue is lowered for inspiration; it is raised for expiration.

While lowered, the air streams in *over* its surface; while raised, it streams out from *underneath* the same, sound following in the wake of each stream of air.

For German speech the precise reverse action takes place: The tongue is lowered for expiration; it is raised for inspiration.

This fact, that the opposite action obtains for German speech to that which obtains for English speech, has given me the key to the entire

situation. Had they been corresponding, I never would have made any discovery. It was due to the fact, that they are not corresponding, that it was so difficult, nay, impossible for me to produce correct English sounds.

This remarkable fact, that English speech is carried on by a process of inspirations and expirations the precise reverse of that which furnishes the vehicle for German speech, offers food for reflection in many directions. Such questions will arise as, Has this always been the manner in which these insular people have spoken? If not, at what period in their history was this change brought about? And what wrought it? As all the nationalities comprising the British empire to-day breathe for speech in the same manner, it will be asked if it was the Celts, Romans, Anglo-Saxons, or Normans that caused it? Some one of these peoples, or some one previous to these, must have exercised so powerful and far-reaching an influence as to compel future generations of various nationalities to change their current of speech; and, in so doing, create one homogeneous language.

What other people besides the English speak in this manner? Which is the most natural and easiest way of breathing, the German or the English way?

Germans exhale their speech, Anglicans inhale theirs. German speech comes direct from the throat, while English speech pursues an indirect course. After being inhaled over the surface of the tongue, it is exhaled from underneath the same. In so doing, its main sound, as it does for all languages, takes the same direction which the expired air takes.

Every sound we hear being in reality composed of at least two sounds, the first part of any one sound, if it is an Anglican who utters it, follows the air inspired for the same, and is heard by reverberation outwardly. The second part, its main sound, is expired, and follows in the wake of the air which makes its exit from underneath the tongue.

With German speech precisely the reverse action takes place. The air is inhaled beneath the slightly raised tongue; it is exhaled from the throat over the tongue.

All studies connected with the voice, and all teaching in regard to the correct use of the same, have been at all times exclusively in connection with the expired breath. It is of greater importance, however, to know how to inspire correctly than to know how to expire correctly. Correct expiration must, of necessity, follow correct inspiration, while the reverse is by no means necessarily the case.

THE DUAL NATURE OF THE VOICE.

THE voice has always been spoken of as a unit, a stream of sounds, and it is quite possible that no one has ever thought that it might not be a unit, a thing by itself, but a composite. Yet such in reality it is.

There are two voices, separate and distinct, which in speaking or singing blend into one and seemingly are one. I call them by different names, each name being characteristic of some especial quality; and I shall use any of these expressions as occasion may seem to require. They are:

The interior and the exterior,
The upper and the lower,
The first and the second (in succession),
The ingoing and the outgoing,
The inhaled and the exhaled,
The initial and the final,
The rising and the falling,

The advancing and the retiring.

The two voices are so distinctly different that they forever follow their own separate channels. The one is forever flowing from within outwardly; the other, from without inwardly; the channel of the one being over and above the tongue, that of the other under and beneath the same. This latter, whose sound for English speech goes out from under the tongue, and for German speech goes in underneath the same, has not before been noticed by anyone.

While speaking, the voice is ever moving in a circle; the English rising voice coming out from beneath the tongue, and receding back over and above the same; the German rising voice coming out from above the tongue, and receding back underneath the same. The two streams follow each other in such rapid succession that they appear as a unit. The one is the complement of the other, and they fit into each other so closely as to appear as one.

Every voice we hear, from murmuring to singing, from moaning to laughing, from the first cry of the new born to the last word spoken

by the dying, follows this immutable law. But it is not man's law alone. It is the law of nature, from the singing of the bird to the roaring of the lion, from the humming of the insect to the neighing of the horse, and the barking of the dog. There is always the upper and the lower, the rising and the falling voice, following each other and blending into one.

Does it not always seem strange that from one and the same instrument sounds should emerge so distinctly different in their character, and so far apart in the musical scale, yet so closely following upon and blending into one another, each sound, at the same time, standing distinctly by itself? All this is executed in so diminutive a space, and by artists who never had any instruction in the use of their instrument!

Besides the wonder of the production of the sounds, there is the wonder of their clearness and distinctness. How is it that the vibration of the previous sound does not mingle with that of the one following on the sounding-board of the oral cavity? I can throw some light on this subject, and shall do so later on.

The musical rhythm of the language, its rise and fall, and ever changing modulation, are explained by the two voices.

It appears to me that the manner in which birds sing, English people speak, judging by the swelling of their throats, the movements of their tongue, and the perfect ease with which they produce their song. The English voice appears to be confined to the head, and does not seem to come from lower depths as the German voice does. Hence the purity of English sounds; while German sounds, coming from lower depths, lack this purity to a remarkable degree, and are accompanied by noises, attributed by Germans, both as regards the consonant as well as the vowel sounds, to some imperfection in the construction of the oral cavity as an instrument to permit the air to pass through freely. These places, against which, they say, the air in its passage strikes, are supposed to be productive of sounds independent of their proper musical sounds, and are, therefore, properly termed noises.

Foreigners speaking English carry these noises

with them into their pronunciation of the English language; and it is this more than anything else which gives to their speech a "foreign" sound, more especially an "offensive" foreign sound. The assumption, that the construction of the oral cavity is not perfect for the emission of pure German sounds, however, is not correct. The obstacle they encounter is the German tongue, which does not move "out of the way" of the sounds, and hinders them in their free emission, causing the noises spoken of. It is less active than the English tongue, which performs any number of gymnastic exercises to assist the sound in coming forth clear and unobstructed.

The movements of the tongue for German speech, though apparently slower, produce sound faster than those made by the English tongue, as they are of a slighter nature, and can, therefore, be carried out much quicker. Germans, consequently, speak faster than Anglicans do.

THE NEW VOCAL CORD.

AFTER many years groping in the dark, getting but the faint glimmer of a light here and there, the first real illumination came to me while I was at Chicago during the progress of the World's Fair. It came to me as a revelation, imparting to me the knowledge of a second voice.

After having, upon continued, careful investigation, become convinced of the correctness of my observation of the existence of this second voice, and of its location as emanating from beneath the tongue, the question constantly arose: By what means is this second, or lower, voice produced? What did nature mean by giving to it such a circuitous route? How can its sounds find their way through this conduit, originating, as they do, in the vocal cords of the larynx, and yet come to the surface clear and undefiled?

Here was a puzzle which, for want of a

proper explanation, threatened to set at nought with others, at least, all that had with me become positive and undoubted facts.

The solution to this mystery came to me while I was traveling. For the purpose of guarding against all possible personal contingencies, and a consequent loss of what had been intrusted to me, I sent an account of my discovery home in a letter, which is now before me. I prefer to give an account of this discovery in the precise words as then transmitted. This letter was dated at Louisville, Ky., October 13, 1893, and the following is an extract from the same:

"I scarcely think that I overrate the importance of my discovery, in view of the fact that our speech is our most comprehensive gift; and that no discovery, heretofore made, of the nature of any of our faculties comes within the scope of our will to control as speech does.

"While still abed on the morning of Tuesday last, at the Southern Hotel, St. Louis, my thoughts, as they have so often done of late, reverted back to this theme. While I was convinced that the sounds of the rising voice, in English, speech, tend from below the tongue outward, I could not fathom the wisdom which

made the outgoing voice pursue so tortuous a channel; the air coming from the throat, thus forcing its way around the sides of the tongue and beneath it toward the teeth, while the tongue's tip is uplifted. Still less could I understand how clear, unmuffled sounds can thus be produced, the vocal cords being hidden behind so many obstructions; until it suddenly dawned on me that that very peculiar, lip-like formation in the lower jaw, close to the front part of the root of the tongue, was another vocal cord—the vocal cord, to the outgoing voice, for English speech.

"Watch it, and see how it trembles and quivers with life and emotion while you speak; how it is eloquent with feeling. Since I have discovered its use, it has become painful to me to look at it, so expressive is it of our soul-life. A synopsis of our entire being, almost, seems to be concentrated there.

"Mystery of mysteries, that that which has been exposed to view at all times, which has been sounding with the notes of speech and song forever, and is thus sounding now should have never been understood, nor even been noticed, by anyone.

For English speech it is the main instrument of sound, while for German speech the vocal cords hidden within the inner recesses of the throat are the ones giving life to their most important sounds.

"In view of those developments, is it to be wondered at that German speech should appear

as coming full from the throat, while English speech appears to be coming from the head? The head of a German, while speaking, is full of action, as if assisting the sounds to come forward. The head of an Anglican is firmly set on his shoulders, with the sound simply streaming out, and without any sign of assistance; hence, gesticulation, vivacity of the muscles of the face, often assisted by the hands and arms even, of the speaker, in the former case, and stolidity, dignity, and reserve in the actions of the latter.

"The existence of the lower voice reveals the fact that there is a circular movement of air for the production of speech. With Anglicans, the air streams into the mouth, over the tongue, and thence into the larynx with the falling voice, and streams out again from beneath the tongue with the rising voice. With Germans, the same proceeding takes place in a reverse order."

These are the main contents of my Louisville letter.

To these remarks I must add that, while I attributed to the lip-like formation in the lower jaw the entire production of the lower voice, I have since ascertained that it is but a part of the instrument; its other part being the frænulum, the cord which connects the tongue with the lower jaw, which is extended or contracted,

in conformity with the movements of the tongue, and the sounds to be emitted. It forms the exact centre of the mouth, and of the lip-like formation beneath the tongue, which it traverses and divides into two equal parts.

The air coming from both sides around the root of the tongue, strikes against the sides of the frænulum, when extended; or against its ridge, when relaxed; and coming together in front of it produces sound. In conformity with the string being fully spanned, or it being in a greater or minor state of relaxation, the air, in striking it, will give forth various sounds.

All changes to which the inner lip is subjected the outer lip is subjected to, likewise. It assumes the same shapes and positions. It is now raised, then depressed; it moves forward, then backward. At times it is full and round, replete with blood and life; at others, it is contracted, and shows a shrunken, and pointed or ragged outline. The former usually obtains during inspiration, the latter during expiration. Together with the tongue, whose

lower front or tip usually rests upon it, sometimes concealing it altogether, then retiring, showing it in part, and retiring still further, showing it completely, and the space of the lower jaw which it encloses, it presents to all appearances another mouth within our mouth. This impression is heightened when the tongue rests upon the inner lip, thereby presenting a similar appearance to the upper lip resting upon the lower.

Owing to this striking similarity, and not knowing by what name it is known in the physiological or medical world, if, indeed, it has a name, I call it the "replica," being almost a repetition, "by the hand of the same master," of the mouth itself.

Not knowing, either, what the "inner lip," or "new" vocal cord, may be called, I have named it the "vocal lip."

As the replica, then, is apt to adopt the correct shape for the proper production of sounds, it will be well to watch our lips to see that they assume the same shape. Only when they do will a sound be emitted in its entire purity;

it being of prime necessity for the outer rim of the orifice of the mouth to have the correct shape, if it is to produce correct sounds. The tongue, while it is resting upon or with its tip moving along the rim of the vocal lip, acts in a somewhat similar manner to that in which our upper lip acts in relation to our lower lip. That is, it creates openings of various shapes and sizes. Through these openings the air is forced, producing various sounds.

At other times, when the tip of the tongue rests within the replica, pressing with its point hard down upon its bottom, upon being suddenly raised it creates an explosion as for *k*, or, by a weaker pressure, as for *g*. Again, by rolling along its surface, it produces the sound of *r*, etc., etc.

The vocal lip moves backward for expired sounds, while the tongue's tip is raised; it moves forward for inspired sounds, while the tongue's tip rests upon it. It takes the opposite direction to that which the tip of the tongue takes, the latter moving backward for inspired and forward for expired sounds.

These are some of the outlines connected with the replica and the vocal lip. It is quite a study, and time must be had for its full development.

What inference may be drawn from a study of the replica and the vocal lip as regards the sounds produced by the vocal cord of the larynx, I can only surmise. I presume, however, that we shall now be able to arrive at a better estimate of its true nature.

It appears to me as if the new school which is likely to arise from these investigations will have to base its technical teaching largely upon a study of the aspect of the replica and the vocal lip in a general, and the changes to which they are subjected in a special, sense.

It is not difficult for anyone to produce a pure sound when one makes a special effort to do so, but to produce pure sounds in connection with other sounds, and to do so habitually, must be the aim of the scholar and of the teacher. To accomplish this, the shape assumed by the lips, and the manner in which the teeth approach each other, must be closely watched. As

they are but a copy of the shape of the replica and the vocal lip, anyone can become his own teacher.

This will be easy in comparison with many of the systems now in vogue, explaining the production of sounds; most of them being too elaborate in their description, and too difficult of comprehension, for the ordinary scholar.

In contemplating the lower jaw as an instrument to produce sound, in comparison with the upper, or with the roof of the mouth, we can perceive why it is that the English tongue is capable of producing such a vastly greater variety of sounds than the German. It is a small but wonderfully constructed instrument, with its numerous knots, ligaments, elevations and depressions. Its ridges and indentures are subject to continuous changes, accommodating themselves to such shapes as are required of them to produce different sounds.

The upper jaw with its plainly vaulted roof, on the other hand, does not possess these qualifications, and is only fitted for the reproduction of those elementary sounds which have their

origin in the vocal cord of the larynx. Hence, while German vowels have but one distinct sound, there are numerous variations for English vowel sounds.

If the roof of the mouth, however, is looked upon as the sounding-board for *all* sounds, which in all likelihood it is, the sounds produced by the "new" vocal cord, as well as those of the "old," are deflected from the same. It will be more nearly correct, therefore, to assume that the "new" vocal cord produces those parts of sounds which are so peculiarly characteristic of the English tongue, while the "old" produces those also known to other tongues; the two blending into each other for all the sounds of the English tongue.

Steamships, nowadays, often carry a double engine, both engines being used while the ship is speeding along. The main object for having two, however, is for the purpose of enabling the ship to continue on its voyage, in case one should be disabled; each engine being the propeller of a separate rudder.

Nature has made the same provision for our

seeing, hearing, smelling, breathing, thinking apparatus, etc. We likewise have two arms, two hands, two legs, etc.; always one in reserve, in case the other should be disabled. And so we have two voices for speaking.

We do not use our two voices, however, just at one and the same time, but in succession. The upper, always first; the lower, following close upon it; as we must inspire before we can expire. They follow so close one upon the other as to appear as one. This is for the English voice, of course; the order for the German voice being the reverse.

Do we hear, see, smell, breathe, etc., also in this fashion, one ear, eye, lung, etc., always first, and the other following closely upon it?

There is no difficulty *hearing* the two voices. Any English vowel sound, slowly spoken, will clearly reveal them. The personal pronoun "I," for instance, composed of the two sounds *a* and *e*—*a* as in "father" and *e* as in "is"—will bring them out very clearly. The first part of this sound appears hollow, being spoken

by the falling voice, while its last part is ringing, being spoken by the rising voice.

There is not only a difference in the sound, but also in the inflection between the first and the second part of this sound; so much so, that they might appear to be spoken by two different persons in quick succession. The German sound "Ei" ("egg") shows precisely the reverse order. It is first loud and then soft.

The same difference obtains with the rest of the vowels. It is very marked in the first letter of the alphabet, when standing by itself. Its first part is *a* as in "have," its second more of an *e*, as in "is." The *a* being spoken by the upper, has a subdued sound; while the *e*, being spoken by the lower voice, sounds clear. *O* sounds like *o-ah*, etc.

EMPHASIS.

AN American gentleman who had been to Berlin spoke to me about the enthusiasm prevailing there for the Emperor (the old Emperor). At the same time, said he, "they had so much respect for the old gentleman that, even while cheering him, they did not allow their voices to come out full, as ours do when we cry 'hurrah;' but theirs had a hollow sound, as if they had got drowned before they got fairly through with their cheering." While his observation, as such, was doubtless correct, the cause he attributed to it, of course, was not correct. In crying "hurrah," the last part of the vowel *a*, in German, is spoken with the retiring voice, and, therefore, sounds hollow; while the same sound, in English, is pronounced by the advancing voice, and when prolonged, as it is in crying "hurrah," it sounds loud and ringing.

This also makes the English voice preëminently

the voice of command. The last consonant or consonants are generally dropped, and the last vowel comes out clear and ringing. It sounds like a trumpet-blast, first hollow and then loud, being produced in a similar manner. On the other hand, and for the opposite reason, the German voice is more soulful, being better modulated; the fall of the voice following its rise, instead of the rise its fall, as in English. In a German serenade, or lullaby, the sound is subdued, gradually and slowly dying out with the falling voice. The same, when attempted by English voices, can never be carried out with the same effect.

In view of these facts, it does not appear to me possible for foreign singing-masters to teach singing to American or English pupils successfully; the voice of the teacher differing from that of his pupil by natural production, their voices take a different direction, and can never come together on the same plane. Hence, the constant complaints of fine voices having been ruined by the method of such and such a master. His method has proven all right with his Italian

scholars, when teaching them singing at home; or with his German scholars, when the teacher is a German. What, then, is the trouble with these "English" pupils? Neither teacher nor scholars ever knew, and they have been at a loss for an explanation.

TRACHEA AND ŒSOPHAGUS.

AFTER giving an account of the nature of the two voices, or of our dual voice as it might more properly be termed, and having also previously described the process of breathing for speech in a general sense, I can now proceed to explain how we breathe for the same in a specific sense.

For English speech we inspire through the windpipe, creating the falling voice, and expire through the gullet, creating the rising voice; for German speech this order is reversed.

This again establishes the rotation of the air, or sound, the same as it obtains in other respects regarding the voice.

All of us are in the habit of speaking at meals. While we are eating, might not the epiglottis be more likely to be able to do its duty in covering up the windpipe, during the time that we either expire or inspire, than it could if it were obliged to do so during both inspiration and expiration? We would come

far more frequently near choking if both streams of air had to pass through the trachea. In a sudden coughing fit, or while sneezing, when we are in the act of eating, food is expelled. Besides, what is it that causes one's breath to be "tainted," when the stomach is out of order? If it came from the lungs, how could the stomach affect it?

It will be admitted that breathing for our lungs never stops, that it goes on forever in its regular method, while life lasts. Such sudden spasms as sneezing, gaping, coughing, laughing,—all would seriously interfere with the act of breathing for our lungs, if entirely carried on through the trachea. This is obviated by one part originating in the channel of the gullet; and the other, in that of the windpipe the same as other regular sounds do. A sudden inspiration through the windpipe always precedes these acts; while the act itself, by an equally sudden expiration, is carried on through the gullet. This relieves the windpipe to a great extent, and permits the act of breathing

to be prosecuted without serious interference by these outbursts.

My final conviction, therefore, is, as already stated, that for English speech we inhale through the trachea, and exhale through the œsophagus, from which the air passes directly beneath the tongue into the lower jaw.

For German speech we inhale through the gullet, the air passing in underneath the tongue, and exhale through the windpipe. In this manner, for English speech, the vocal cords are passed first inwardly, and the vocal "lip," last, outwardly. While for German speech the vocal lip is passed first, and the vocal cord last. This fully explains the phenomena of the voice, and the tendency of the sound in both instances.

THE CIRCULATION OF SOUND—CIRCLES.

WE say, our tongue slips up and down, backward and forward. In saying so, we state that which *seems* to be the case, and, in a measure, really is the case. As a matter of fact, it is stating but a part of the tongue's movements. To fully state what the tongue does will be giving an account of one of the most interesting observations I have made.

The tongue does not move in the oral cavity by slipping up or down, backward or forward; but its movements are in the shape of circles, and it never moves in any other way. These circles are described by the tongue's tip. They are not complete circles, however, but segments of circles only. The tip of the tongue, in describing them, goes as far as it is able to go, the remaining part of the circle for its completion being left to the imagination.

All movements, in fact, connected with speech are circular in their nature. The air

for speech moves in circles, the sound which it produces has the same tendency; and so have the movements of the tongue, in causing the admission and emission of air, and in connecting the two voices.

The tongue, in an English mouth, makes so many movements, and carries them out with such velocity, that the oral cavity, while we are speaking, seems to be completely filled with the same. In view of this fact, it had long been a riddle to me to know how English sounds could find their way through this maze of movements of the tongue, and come to the surface with so much distinctness and clearness. The movements of the tongue in circles will explain it; these movements being made for the very purpose of assisting sounds to come out clearly.

Before any sound is uttered, the air is drawn into the oral cavity by a previous expiration, causing a vacuum. The air, thereby attracted, is drawn into this vacuum by a swinging motion, and strikes the tongue obliquely at its tip. We can distinctly feel this. There is a draught of air passing over the tip of the tongue with every

inspired sound, which has a cooling effect, in drying up its moisture. For every German inspired sound we can feel the same effect, *beneath* the tongue. The air then follows along the surface of the tongue into the larynx. To aid the air in being thus absorbed, the tongue's tip points downward, while the upper jaw and teeth and the upper lip are raised. Then follows the second movement for expiration, by the raising of the tongue with its tip pointing upward. In so doing the air and the sound are expired from beneath it, while the lower jaw and teeth and the lower lip are depressed.

These two movements are repeated once more for the same sound, making four movements for each sound, or six, more properly speaking, as explained further on. It is not a simple lowering or raising of the tongue's tip, however. After inspiration, its tip is, in reality, raised to the roof of the mouth. It then comes down with a graceful movement inwardly, describing a circle, until its tip reaches the upper row of teeth. Here the sound is emitted through an opening formed between the tongue's lower side and the

lower row of teeth. It now moves up again to the roof of the mouth, from whence it comes down, with another circular movement, outwardly this time, until it reaches the lower row of teeth. Here inspiration takes place through an opening formed between the surface of the tongue and the upper row of teeth. After this, there is another expiration for the same sound.

The movement, which brings the tongue forward for expiration, is synonymous with the slipping forward of the tongue; the second movement, which brings it down for inspiration, appears to us to be simply the slipping back of the tongue. For all sounds of the upper voice, consequently, the tongue slips back, while for all those of the lower it slips forward.

The fact is, nature does not work like a blacksmith, but by gentle movements, graceful curves, and the most artistic touches, it attains its results. Yet, withal, it moves so swiftly that we can scarcely follow its movements.

Nor does nature deal in solids, but rather in compounds. Where we imagine there is one thing, there may be hundreds. Thus we hear a

sound, and say it is such and such a note, or such and such a letter. Yet there are many sounds to make up this one sound, and in the process of its production more subtle factors enter then we shall ever gain a knowledge of.

The tongue performs the work of converting the air into sound, by sending it in different directions in the oral cavity. It fans it, sweeps it together, so as to mass it in one spot, or whips it into submission, in accordance with the sounds to be produced. In doing this, it makes incessant motions, apparently of an indescribable and wilful nature. In reality they are all circular in shape and move in the graceful manner heretofore described.

An English tongue hangs loosely in the mouth, as loosely almost as does a tongue suspended in a bell. It is ready at any moment to obey the command of its bellringer, the mind. A German tongue, on the other hand, rests on the floor of the mouth, and touches it or some portion of the oral cavity even during the formation and enunciation of the vowel sounds. The English tongue, in so doing, is completely

withdrawn from any contact with the oral cavity. This touch of the tongue against the teeth, or other parts of the mouth, is the cause of the noise always accompanying German vowel sounds, of which the English voice is absolutely free.

During the act of speaking, the tongue's tip, while swinging with a circular motion, now up, then down, always returns to the soft-palate. There is a point of the soft-palate which must be touched by the tongue's tip every time a new sound is to be evoked, so as to stop the vibration of the previous sound, on this, the sounding-board of the oral cavity. If this were not done, there would be an endless intermingling and confusion of sounds, and none would ever be heard to stand clearly and distinctly by themselves.

The centre, around which the circles revolve, is the opening to the throat. The tongue's principal aim, in swinging up and down, is for the purpose of giving to the air free egress and ingress from and into this opening. The swingings of the tongue, consequently, mean

breathings; it swings up for expiration and down for inspiration, each breathing being accompanied by a sound. In swinging down, by an outward movement, the tip of the tongue stops below the lower teeth to permit the air to enter above it. In swinging up, by an inner motion, it stops above the upper teeth to let the air out from beneath it.

The circles, which the tongue describes, as far as their circumference is concerned, are determined by the sound which is to be produced. It is larger or smaller in accordance with the force which it is necessary to employ to produce such sound.

This last remark does not have reference, however, to the stopping of the previous sound on the sounding-board of the oral cavity, but to a second tap of the tip of the tongue, given to this sounding-board, either the soft or the hard-palate, immediately following the first tap. This tap is applied to various parts of the palate for the enunciation of the different consonant sounds. The greater the power the sound is to have, the higher up must be the touch, and the

greater must be the force with which it is applied. And so will be the circle larger or smaller; and it will be executed with greater or less force and rapidity, in accordance with the sound which is to be evoked.

This greater or less force is also shared in by the air, which is being inhaled for the same sound. The higher the touch, and the greater the circle, the larger will be the opening thereby created in the cavity of the mouth, and in the same relation thereto will be the current of air absorbed for such sound.

In likening our apparatus to produce sound to a string-instrument, I have compared the air or nerve-channels, through which or alongside of which the air-sparks we inhale for speech travel, to the strings of this instrument.

In touching a certain spot of the hard or soft-palate with the tip of our tongue, with the intention of producing a certain sound, especially a consonant sound, we open this cord, whose sound-nerve has its ending here for this sound.

It is astonishing with what certainty the tip of the tongue touches these spots from which it

expects to draw these sounds. If it should touch the wrong spot by ever so little, the cord will not respond, and the sound will not be heard, or we may hear a false sound, not the one we expected to hear.

How the cords are "touched" for the *vowel* sounds, I cannot imagine, as there is no touch. They are simply the children of our imagination become real, they are the product of our will. We "will" a certain vowel to sound, and the vocal cord or lip opens up the nerve-string with which it is connected. The cords for the vowel sounds all centre and have their ending in the vocal cord and lip, and their sound is prolonged, in conformity with our will, or our muscular ability to breathe for it.

DEFECTIVE SPEECH.

THE circles which the tongue describes are the proper gauge for speech. For English speech they are large, and English to be well spoken must, therefore, be slowly spoken; much slower, at least, than German is. It is very difficult for a person to speak English fast and yet form his circles to perfection, good speech being synonymous with a perfect *chain* of circles.

When a person speaks too fast for melodious utterance, we should say that his circles are too small; when his speech is sluggish, that they are too loose; when he stutters, that his circles are broken; when his speech is rough and unmannerly, that they are out of shape or in bad shape; when he speaks in a high tone of voice, that his circles are raised up too high, locally; when in a low tone, that they incline too far down; when he speaks distinctly, that they are complete; when he speaks with expression, that they are vigorous; when he speaks melodiously, that they are

of the best material; and when he speaks with feeling, that they are elastic, that they widen and contract.

When I say that stuttering is synonymous with the circles being broken, I mean that there is a lack of continuity in speech. This is caused by the two voices not following close upon each other, not chiming into each other. The upper voice utters a sound, but the lower is slow in responding. The tongue fails to complete its circle for it. Or the tip of the tongue may not hit the proper place in the roof of the mouth for such sound, and thus not describe the correct circle.

The circles become deranged, in the first instance, through excitement in the nervous air-channels, superinduced by a latent though ever present fear of breaking down. If this fear could be completely allayed, there would not, in all probability, be any stuttering that could easily not be cured. As the circles represent breathings, by endeavoring to breathe correctly for speech this nervous excitement will be allayed, and the circles will become full and equable.

There should be no trouble in correcting such faults, provided the stutterer can be made to understand what he is required to do. He must begin by speaking slowly and deliberately, constantly watching his mode of breathing and his circles; and as soon as he breaks down, he must repeat the sound until he can do so with perfect ease.

I was a stutterer, or, at least, a very defective speaker of the English language. If I have succeeded, by certain rules strictly applied to my speech, in curing myself of these defects, is it not likely that the same rules applied to the defective speech of others will also cure them of their defects?

EXTENSION AND CONTRACTION OF THE ORAL CAVITY.

THE English tongue hangs loosely in the mouth. The air circulates freely around it. Nature has made its house, the oral cavity, a certain size, but the speaker increases it by now raising the roof, and then depressing the cellar. The roof is raised for inspiration, the cellar is depressed for expiration. When the tongue is properly balanced, between the air streaming in over it, and coming out from beneath it, the sounds of speech or song will flow unrestrainedly from the mouth, *where the two streams meet.*

During the act of inspiration nature provides for a free ingress of the air into the oral cavity by raising the upper lip, the soft-palate and the uvula. The body of the tongue rests in the lower jaw, and is confined within the bed formed by the lower teeth. The tongue's tip points downward, and its surface, within its confined position, is slightly convex.

All this is changed immediately for expiration. The soft-palate and the uvula fall, assuming their natural position, so does the upper lip; but the lower cavity now asserts its rights. The lower lip is drawn down, the chin is squared and extended downward and outward, and in so doing the bottom of the mouth is depressed. This increases the size of the lower cavity to a considerable extent.

The tongue's tip which for inspiration had made a circular movement outwardly, from the roof down, and was then confined together with its body within the bed formed by the lower row of teeth, is now raised, by swinging upward, immediately to come down again, however, first, by an inner motion, and then by an upper, until it reaches the upper row of teeth. During this latter motion the entire body of the tongue is lifted up, its sides are spread out, and overlap both rows of teeth, while its surface assumes a slightly raised shape. It looks, to all appearances, like a mushroom with its thickset root and spreading roof. The latter is raised up

beyond the opening to the throat, bringing the same completely beneath its shelter.

The ligament which connects the body of the tongue at its root with the throat, and grows some distance down the throat, is lifted up together with the body of the tongue. While in this position it is narrowed down to such an extent as to *leave the opening to the throat free and uncovered on both sides.* Through these openings the air finds its way out beneath the raised sides of the tongue.

The entire lower portion of the mouth being depressed and extended, the air streams from underneath both sides of the raised tongue into the front part of this extended opening, after having first formed a unison at the frænulum, and having produced sound by its aid and that of the vocal lip.

All this extensive proceeding is gone through with for every sound that is uttered, nay, for every half of such sound. As for the other half, the upper portion of the oral cavity undergoes similar changes; the former being for the

expired portion of such sound, the latter for the inspired.

It appears to me—and I am well convinced that this observation is correct,—that *all* breathing through the mouth, whether for speech or otherwise, is carried on in the same manner as just now described. For its verification it will but be necessary to watch the tongue of a dog on a hot summer day, while it is partly hanging out of his mouth. The heat has to some extent dried up the fluid in his mouth, and he is panting for breath. The air finds its way freely into his mouth over and above the tongue, but his expiration labors under difficulties; and you can readily observe his expired breath lifting up his tongue at regular intervals from underneath the same, while it is making its exit from his mouth.

It is, however, quite possible that dogs inspire from underneath the tongue, and expire from above it. In that case, his panting would arise from his difficulty in inspiration. This, in fact, appears to be the most likely. His tongue, overlapping his teeth, would make the entrance

of the air into his mouth a rather difficult proceeding; hence his efforts in giving it admission.

There being three inspirations and three expirations for every vowel sound that is uttered, the two movements just described follow each other in an incredibly short space of time. Their rapidity, of course, depends upon the rapidity of the speech which is being uttered.

The rise and fall of the tongue is identical with the rise and fall of the voice. The tongue rises to make room beneath it, for the exit of the rising voice; it falls to increase the room above it, for the entrance of the falling voice.

It goes without saying that all this takes place for the German language in the reverse order.

While circles, described by the tongue for English speech, are large—the rising voice having its birth in the lower cavity and, therefore, requiring a great extension of room therein—the circles for German speech are much smaller. Expiration taking place direct from the throat, there is no necessity for a greatly increased space. Nor is the tongue brought into requisition to the same extent as in English, as

a vehicle to assist in forming sound. Hence, for German speech the tongue is required to be making but *comparatively* few movements, which, apparently, scarcely remove it from its normal position. I say "apparently," for, while these movements are scarcely to be noticed, they are of the same *order* as those made by an English tongue, only greatly modified in measure and rapidity of execution.

German sounds, consequently, are not as clear and as positive as English sounds, though they are louder, especially the vowel sounds, in coming direct from the throat; the clearness of expired English sounds being partly due to the trumpet-shaped funnel through which they pass.

All there is of harmony and melodious sound in speech or song is produced by the gradual dissolution of the upper voice into the lower. The rising voice produces a positive sound, a mould out of one piece, as it were. The continuous flow of the voice, after the production of this sound, gradually melting into the falling voice, adds harmony to the same, as illustrated

by the German voice. The falling voice gradually advancing into the rising voice, gives its melody to English sound.

All through German speech and, of course, song, there is a rise and a fall; all through English speech and song there is a fall and rise of the voice.

This is beautifully and significantly expressed in German in the words:

⏑ — ⏑ ⏑ — ⏑ ⏑ — ⏑
Das | Heben und | Sinken der | Stimme,

which takes the opposite direction in English in saying:

⏑ — ⏑ ⏑ — ⏑ ⏑ —
The voice | in its rise | and its fall.

This is a very interesting subject, but I cannot at present elaborate upon it. I will only call attention to the fact, which is an outcome of this condition, that we find the long syllable, as a rule, at the end of each line of English poetry; while German poetry admits of both endings with equal felicity, the short as well as the long; the latter being, in reality, not abruptly so, but tapering off in a subdued tone with the short again.

THE MAN WITHOUT A LARYNX.

AT the gathering of elocutionists recently had in Philadelphia, a member of the medical faculty spoke of a man whose larynx it had become necessary to remove in order to save his life. It was a delicate and no doubt very skilful operation successfully performed. Part of the operation consisted in attaching the man's windpipe to his throat, into which an opening had been made. This opening was closed artificially, but in such a manner that he could freely breathe through the same.

The entire apparatus by whose aid speech is produced having been destroyed, there was great surprise when, sometime after the operation, the man suddenly commenced to speak. His voice, however, was not what it had been; it had lost its elasticity, its cadence. It was all of a monotone, with rather a hoarse, hollow sound, and made the impression of being pushed out rather than flowing out freely and of its own accord. Still it was quite natural, and he could even

sing, in a way. It was also distinct, and quite audible at a moderate distance.

When he spoke, his tongue was *almost continually raised.* This phenomenon was a great puzzle, there being no way in which to explain it, until our doctor noticed that some kind of a cartilage had been formed on one side in the throat, and the air, by retroaction, in some way caused this cartilage to vibrate. Nature had thus kindly provided him, in a new place, with a "new vocal cord," and "this it was which gave the man his voice."

As if an excrescence, any stick almost, could replace the vocal cords of the larynx, the wonderful, the incomparable! You might just as soon expect a man's power of vision to be restored, in being replaced by an outgrowth on his face, having an outward appearance somewhat similar to his lost eye.

It would not well be possible to find a stronger vindication and a more perfect proof of the correctness of what I have ascertained, than this doctor's recital of this case.

The man's inspired voice, supposing him to

have been an American, was gone, and there was nothing left to him but his expired voice. All there was that could have enabled him to speak from his throat had been destroyed.

Yet there was a voice, not the one which was dead, but another, a strange, new voice. Some miracle had to be wrought, to explain it, and so they discovered the cartilage, which came very opportune, just at this time!

We know better, however. The voice with which he spoke was the one hidden underneath his tongue. The latter he could not help *but continually* "*raise*" to let his voice out. All that part of his mouth which was above his tongue was inactive; his inspired voice being lost, there was nothing for it to do. All there was of activity was in that beneath his tongue.

His voice was sustained by the expired air, which came from his gullet, and which, in making its way out from beneath the tongue, made the man's replica and vocal lip, which were in a perfect state of preservation, resound with the sounds of speech and song. *They*

spoke, yet with that monotone which characterizes the tones of the *single* voice.

The cadence was wanting, the intonation, the rise and the fall of the voice, which can only be produced by a gradual sinking of the tones of the one voice into the other, or by a gradual rising of the sounds of the one voice out of the other. The man spoke with the sounds of the rising voice only, if he was an Anglican, which I suppose he was, having been deprived, by its destruction, of the voice which produces the falling sounds.

THE SOUND REPRESENTED BY THE LETTER R.

I HAVE heretofore spoken of sounds in general, nor do I propose in this treatise to enter fully into the details of the production of each individual sound.

What I have ascertained about consonant sounds I will illustrate by making a thorough analysis of the production of the sound *r*. In so doing, I shall have to repeat things already mentioned. It will serve, however, to give a better general idea of the nature of the production of the consonant sounds.

For years I had been a martyr to this sound, the greatest foe known to the helpless foreigner wrestling with the English tongue. After all the rest of the sounds had surrendered, the *r* stood out by itself, holding the fort and hurling defiance at me.

All I would say was readily understood except words containing this unconquerable sound.

This was the case more particularly with words in which the *r* was preceded by *o*, *ou*, *a*, *b*, *p* or *c* (as *k*), or in which it was succeeded by *oo*, *o*, *ou*, etc., as "orange," "organ," "origin," "order," "store," "core," "lore," "rose," "row," "Rome," "room," "rook," "crook," "crank," "crow," "court," "cry," "broil," "brass," "brown," "price," "proof," "print," "brook," "Brooklyn," "scrape," "roar," "brewer," "brine," "breeze," "chord," "cur," "word," "world," "art," "hurt," "part," etc.

They were my sworn enemies, and I hated them most cordially. Whenever they occurred, I tried to get out of the scrape by substituting some other word, if I could possibly find one.

To this sound's obstinacy, however, I am indebted for my final victory over *all* the sounds. In finally yielding, not to my superior generalship, but to my never ceasing pertinacity, I starved it into submission. In so doing, it left to me, as my booty, its secret, which it shared with the rest of the sounds, and which they had kept inviolate together ever since man first

uttered an articulate sound—their secret of the dual voice.

I had become surfeited with hearing and seeing at the great Chicago Fair, having been there for months. After my family had left, and being obliged to remain there some time longer, I retired to the extreme other end of the city. There, in the solitude of Lincoln Park, I took up my study of vocal sounds once more, and, retiring completely within myself, this secret came to me.

Under my incessant endeavors to produce the English *r* sound, my voice at last "split" in two. I distinctly felt the separation. Each part became a living thing by itself; one part producing an *r* which rolled over my tongue back into the larynx, while the other was sending an *r* to the surface from *underneath* my tongue.

It frightened me. I felt that something unusual had happened. I repeated these sounds, and then stood before the fact, that I had become a participant with nature in one of its great secrets—that I was the first man to whom

this secret had been entrusted. The past seemed to be suddenly opened, and over its dark blue waters there was one ray of light, which came straight to me. This was the vision I had at the time.

I felt awed, and more oppressed than elated, having become burdened with a great responsibility. Of all the tongues that have ever spoken, and of all which are speaking to-day, no man ever knew how they were speaking.

What I found out about the letter *r* cannot be said in a few words. It represents two sounds, materially differing in the manner of their production. The one is the product of the inner, the other, of the outer voice, or the voice produced by inspiration and by expiration respectively. These sounds follow each other in such quick succession that they appear as one.

The first, produced by inspiration, requires that the tip of the tongue shall first touch the highest part of the roof of the mouth it can reach. With an outward movement, that is, with the tip of the tongue pointing toward the lips, it then comes down to the root of the

lower teeth. After this, with a vibratory movement, it rolls inwardly over the soft part of the lower jaw until it reaches the enclosure of the replica in whose boundary it momentarily rests, while still continuing to vibrate.

By this movement the tongue's back is gradually raised until it comes in contact with the soft-palate. A vacuum having been created by expiration previous to this movement, the air streams inwardly through the temporary openings created by said vibrations between the back of the tongue and the soft-palate, and produces the sound of the *r* of the falling voice.

This sound, though created by an inward flow of air, becomes audible by reverberation over the surface of the tongue outwardly. In carrying out this movement, the tongue is contracted and drawn away from the teeth.

I want to call especial attention to this, as the tongue with *all* sounds of the expired voice presents a similar appearance.

To produce the *r* of the expired voice, the tongue's tip releases its hold on the replica, slips up to the roof of the mouth, which it touches a

second time, and then coming down by an inner movement—that is, pointing toward the throat —it again rises upward until it reaches the same spot of the soft-palate which it had touched before, and against which it vibrates.

While making this movement, the tongue's body is raised and its surface flattened out, spreading its sides over the teeth of the lower jaw on both sides. The air, meanwhile, being expired from beneath the sides and the front of the tongue, while its tip is vibrating against the soft-palate, causes a thrilling sound to be heard issuing from beneath the tongue, which is the *r* of the rising voice.

The lifting up of the body of the tongue, while its tip reaches forward and upward, takes place for all sounds of the expired voice.

The tip of the tongue, consequently, touches the roof of the mouth three times in producing the *r* sound. All these movements being repeated once over again to complete this sound, this touch is really made six times. This is equal to three inspirations and three expirations for every *r* sound which is ever produced.

The *r* sound as we hear it, or even when we do not hear it (as with some speakers it is merely an inspiration and an expiration of the air, being devoid of the thrill produced by the touch), is always produced by a combination, or, more strictly speaking, by a succession of these two movements. The *r* of the upper voice is produced first, that of the lower immediately afterward, the two running together and producing one continuous sound.

When the *r* sound is heard to roll continually, as it does with some speakers, the two movements here described are repeated a number of times in close succession. It is done by a succession of inspirations and expirations carried out in this manner, possibly equalling sixty, every time they pronounce this sound.

These two movements, the first for inspiration the latter for expiration, are in a similar manner carried out for all sounds, the entire scale thereof, as previously mentioned.

This is the secret of the letter *r* of the English language, which, after solving, gave me the key

to the entire situation, as all sounds are produced in a similar manner.

It seems scarcely possible that all these movements should be carried out during the short space of time in which this sound is pronounced.

This is not *all*, however, for there are other movements of the tongue, connected with it, of which I shall speak at length when I come to the vowel sounds.

Yet man's nature is so alert that the scholar, after going through these evolutions several times, will find that he can execute them quite rapidly, and that they will soon become automatic with him.

I have illustrated the production of the *r* sound so minutely in order to show the *general* manner of the production of sounds. For the sounds of the upper, the inhaled voice, the tip of the tongue always rests momentarily near or at some point back of the lower teeth, to permit the air to flow freely inwardly over the tongue's surface. For those of the lower, or exhaled voice, the tongue's tip rests momentarily against the upper teeth, or at some point beyond them,

to permit the air to flow freely out from beneath the tongue.

I still want to call attention to the shape of the movements herein mentioned. For the inspired sound, the tongue's tip moves in a half circle, pointing outwardly; for the expired sounds, it moves in a half circle, pointing inwardly. These two segments form one complete circle.

CONSONANTS.

CONSONANTS proper are noises, produced by certain well-known, mechanical devices. We cannot take a noise and attach to it another noise, any more than we can take a bead and attach to it another bead. It takes a string, run through the beads, to bind them together. The string which binds the consonants together in speech and makes them cohesive, and speech itself coherent, are the vowels. Where several consonants follow close one upon another, we must run in our string of vowels to bind them together.

The nature of the vowels is as opposite to that of the consonants as soul is to body. They permeate the matter of the consonants and surround it; they uplift it, and carry it along.

Consonants have been divided into two classes: (1) the mutes, *b*, *p*, *d*, *k*, *c* (as *k*) and *g* hard; and (2) the semi-vowels comprising all the other consonant sounds.

The above are all the mutes there are, ac-

cording to my idea; others, however, have named more than those.

The semi-vowels, *l*, *m*, *n*, *r*, are also called liquids.

I have made the observation that the mute sounds never follow each other in close succession in one and the same syllable. They rarely, in fact, follow close upon one another in any word, even in such a way that one ends a syllable and the other begins a new one. They are inanimate, and can only be carried along on the wings of a vowel, either in its pure shape or in the shape of a semi-vowel.

The voiced consonants, or semi-vowels, are a combination of a noise and a musical sound; the latter consisting, in the vowel, of the syllable to which said consonant belongs. It precedes them, succeeds them, and even splits them in two, inserting itself between the two parts.

While the mutes are produced by mechanical means only, the organs of the voice being closed, the semi-vowels are voiced sounds. The voice is thrown into them and pervades them.

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We cannot pronounce any consonant, however, unless it is preceded by a vowel; that is to say, the vowel need not precede it bodily. There may be as many as three consonants ahead of it, still it becomes necessary to sound the vowel first, in an undertone at least, before we can begin to pronounce the first consonant, the vowels being the tie connecting all speech. Without them the consonants could not be *moved*, they would be inert.

Consonants and vowels are so intimately connected and interwoven that they cannot be treated separately when their construction is being considered. I shall, therefore, proceed now with the *mechanical* construction only of the consonant sounds. I do not propose, however, to do so in detail, but shall give a full account of the representative sounds only.

K.

K is not greatly dissimilar in its construction to *r*. For the inspired sound the tip of the tongue takes a very firm hold on the bottom of the inner mouth, whereby its back is raised close

up to the soft-palate. Just previous to that there is a complete expiration; the throat is closed, and a vacuum is created in the air-channels. The tip of the tongue, by suddenly relinquishing its hold on the replica, causes an opening to be made between the raised back of the tongue and the soft-palate, through which the air is forced, producing the *k* sound of the inspired voice.

For the expired sound, the throat is again closed, this time, however, to keep the inspired air in confinement.

By the tip of the tongue relinquishing its hold on the replica, as just stated, and then taking a firm hold against the highest point of the soft-palate which it can reach, the confined air, upon the tongue's tip suddenly releasing this hold, streams out from beneath the sides of the tongue into the replica. This sudden movement causes the explosion whose result is the formation of the expired *k* sound.

Upper and lower *k* follow each other in such quick succession that they appear as one sound.

What is most remarkable in this connection is

the fact, that, while the manner in which they are produced varies considerably in its detail, the result should be so similar that the most attentive ear cannot detect any difference between them. The same remark may be applied to *r*, and all the rest of the consonants.

For *k* the touch of the tip of the tongue appears to be even higher than for *r*, and the circles the tongue describes are, in consequence, larger.

G (hard).

G as in "good," is a modification of *k*. The tongue's tip does not press so hard against the bottom of the replica or the soft-palate either. Its pressure, therefore, when released, does not produce so strong an explosion, either for the inspired or the expired *g* sound.

Q.

Q is the same sound as *k*, followed by *u*.

X.

X is also the same as *k*, followed by *s*.

B.

B touches the hard-palate, comes down to tne roots of the lower teeth; the lips are pressed together all along the line, which pressure, being released, results in an explosion. This is for the inspired sound. For the expired sound, the same proceeding takes place, with the only difference that the tip of the tongue rests against the root of the upper teeth. The circles, which the tongue describes, are but moderately large.

P.

For *p* the same proceeding is gone through with as for *b*, only with increased vigor of movements. The latter are more rapid, the lips are pressed more firmly together, the tongue's tip reaches up higher, touching the soft-palate, and again lower down pressing against the bottom of the replica so as to create a larger space of confined air which, when released, causes a greater explosion through the suddenly parted lips than for *b*. The circles, of course, are also larger.

M.

M, the same as *b* and *p*, is a lip-sound. The tip of the tongue slightly touches first the upper edge of the lower teeth for the inspired, then the lower edge of the upper teeth for the expired sound. With each touch of the teeth the lips, which have been rather firmly closed all along the line, are released, not suddenly as for *b* and *p*, but with a slower movement. The sound comes through the nose. The circles are about the same as for *b*.

N.

N is produced in a similar manner to *m*. The difference is that the teeth are closed, where the lips were in the former case. The sound comes through the nose. The circles are larger than for *m*.

D.

D is produced by the tip of the tongue and the teeth; the former touches the lower teeth first, then the upper. The tongue's tip describes but a small circle.

T.

T is produced by the tip of the tongue and the teeth, the same as *d*. The former touches the root of the lower teeth first, then that of the upper. The touch is higher up and lower down than for *d*, and is far more distinct. It is of shorter duration than for *d*, being quicker and more decided.

Th (sharp).

Th sharp, as in "thorn," "three," etc., is produced by the tongue's tip passing through the almost closed teeth. While in this position it first touches the lower teeth, then the upper, oscillating between them. The air passing through this narrow aperture, first inwardly then outwardly, with a quick movement, produces the well-known sound of sharp *th*.

Although the tongue appears to be continuously inserted between the teeth, during the production of this sound, it really disappears between these movements. During this disappearance it describes a circular movement in the oral cavity, by which the sound, which is

inhaled, is connected with that which is exhaled. The sound, which also appears to be continuous, is really interrupted, likewise, for a moment, during which this circular movement is being carried out.

Th (soft).

For *th*, as in "the," "that," "though," etc., the same movements are gone through with as for sharp *th*, but the teeth are further apart, the tongue's tip does not pass so far in between them, and the circles are smaller. The lips are not so far apart, nor are the teeth shown as much as for sharp *th*.

The movements of the lips can be closely watched for sharp *th*. The upper lip is withdrawn first, then the lower, next the upper, and finally the lower again. This is assuming that the sound is repeated twice, which, in fact, it is every time it is pronounced.

The *th* sound comes next to that of *r*, in the difficulty of its execution by foreigners. The same being unknown to other European languages, except the Spanish, it is a great stumbling-block

to the foreign tongue. Yet its execution is not any more difficult than that of almost any other consonant. The trouble is that its mode of production has heretofore never been accurately described.

F.

F, for its inspired sound, is produced by the lower lip reaching up to the upper teeth. While the tongue's tip touches the lower teeth, the air is drawn in above the tongue through a slight opening between the lower lip and the upper teeth. For its expired sound the tip of the tongue touches the upper teeth, the air being forced out between the raised lip and the lower side of the tongue.

V.

V is produced in the same manner as *f*. The difference consists in lip and teeth meeting less closely, and the tip of the tongue touching the teeth more lightly. The air is not set in such quick motion, and the sound is produced with less force.

The circles for *v* are, of course, smaller than they are for *f*

S.

S is produced by the teeth coming close together, the tip of the tongue first touching the lower and then the upper teeth near their edge, the air being first inspired and then expired with a hissing sound.

C.

C is the same as *s*, only carried out with less force throughout, and the tongue's tip not touching the teeth near their edge but at their roots.

Z.

Z is a still milder way of going through the same performance. All the movements are carried out in the softest manner possible, and the tongue's tip touching the gums of the teeth instead of their edge as for *s*, or their roots as for *c*.

L.

For *l* the tip of the tongue vibrates between

the upper and lower teeth, which come pretty close together. Each vibration means one inspiration and one expiration. Each vibration, of course, also stands for one circle up and one down, which the tongue describes through the oral cavity, the circles being large.

H.

H is equal to a quick inspiration followed by a strong and long continued expiration. There is an expiration, however, preceding the inspiration, so as to insure a full volume of air being inspired, which in turn again insures the strong expiration, which carries the sound. The circles are large.

Y.

There is a great similarity between *y* and *h*, both being produced by strong aspirations only, and without any touch, the same as the vowels. The difference is that for *h* all the avenues are kept wide open, while for *y* they are drawn close together, leaving but a narrow channel for the air to pass through. Again, for *h* there is an ex-

piration, an inspiration and an expiration, while for *y* there is an inspiration, an expiration and an inspiration. The stress is on the expiration for *h*, and on the inspiration for *y*, making the former an expired and the latter an inspired sound. For the inspired *y* sound, the body of the tongue closely approaches the roof of the mouth, while for the expired sound it comes very near to the floor of the mouth, the air pressing through these narrow openings, first inwardly, and then outwardly.

G (soft).

G in "George," "gipsy," etc., is composed of *d* and *y*, with the air-channels still more closely compressed, however, than for *y* alone.

W.

W, double *u*, or, more strictly speaking, double *o*, is composed of these vowels, *oo*, combined with an open *v*, the vowel sound vibrating through this consonant making it an open sound very much like a vowel.

This attempt at a description of the consonant

sounds is only correct in a *general* sense; nor is it a *full* description, in any sense. There are many consonants, which are not represented by the sign of a letter, and whose existence can only be made clear to the eye, by showing them up in their combination with other sounds. These varieties I shall not attempt to describe. Incomplete, however, as this description of the construction of the consonant sounds may be, it probably comes nearer to the facts than any that has yet been attempted.

Besides, the relationship existing between consonants and vowels is so close that it is difficult to separate the one from the other. This relationship I shall endeavor to describe more minutely, when I shall reach the vowel sounds.

Then there is the important question of the *impetus* given to the different consonants. There are those whose impetus is toward inspiration, those whose impetus is toward expiration, and those which vary between the two.

I have found that the impetus of consonants whose principal sound is produced by a strong impact of the tip of the tongue with the replica,

causing an explosion above the tongue, as hard *g*, *k*, *qu*, *x*, *j*, *y*, hard *c*, and *r*, are mainly inspired as the tongue first rises, and then falls for them. Those whose main sound is produced by impact of the tip of the tongue with the roof of the mouth, as *f*, *l*, *n*, *p*, *t*, *s*, all of which require more or less compression, and a proportionate explosion of air *beneath* the tongue, are mainly outgoing sounds, asthe tongue first falls and then rises for them. That is, their *main* sound is expired, while in the former case it is inspired. The impact of the tip of the tongue with the lower gum means the rising of the back of the tongue, creating a narrow passage between the latter and the soft-palate, through which the air streams inwardly, while an impact of the tip of the tongue with the roof of the mouth means a compression downward, creating a narrow passage between the lower side of the tongue and the lower gum, through which the air passes outwardly.

There now remain the consonants *b*, *d*, *m*, *v*, *w*, *z*.

These are of a medium calibre. Their sound

is neither distinctly ingoing nor outgoing, but it varies according to their position. As a rule, when they are initial sounds, it is ingoing, when they are final, it is outgoing.

In this connection I have also made the following observation: We say: *b*, *c*, *d*, *g*, *p*, *t*, *v*, *z*. Again we say: *f*, *l*, *m*, *n*, *s*, *x*, *h*. In the first instance, the vowel sound *e* follows, while in the last it precedes the sound of the consonant.

The same order obtains with the alphabets of most civilized tongues. There must be a deep significance in this. We could not reverse this order of things, and say: *ib*, *ic*, *id*, *ig*, *ip*, *it*, *iv*, *iz;* nor could we say: *fe*, *le*, *me*, *ne*, *se*, without making an effort in doing so. The reason is, that the most natural way of speaking is by inspiration, followed by expiration; the vowel sound at the end in the first instance, and at the beginning in the second, securing this result.

When we say: *b*, *c*, *d*, etc., the long ē is an outgoing sound. This makes the consonant sound preceding it ingoing. While, when we say:

f, *l*, *m*, *n*, etc., the ĕ preceding the consonant is ingoing, being short and inhaled; this makes the consonant following outgoing.

In speaking of the impetus of a sound being ingoing or outgoing, I must still remark that the same is identical with the last manner of breathing for such sound; that is, while there are three inspirations and three expirations as a minimum for such sound, the last one of these six, or twelve, or eighteen, carries with it the sound proper and is prolonged in so doing. If this last breathing is ingoing, then the sound is ingoing; if it is outgoing, then the sound is outgoing.

No sound can be uttered all by itself as either ingoing or outgoing. The ingoing sound must be accompanied by an outgoing sound, though ever so weak, and the outgoing must be accompanied by an ingoing, though ever so weak; the weakness of the one giving an impetus to the other. It gives the other an opportunity to gather strength, and be produced with full force.

The "ethics" of sound, if I may be permitted

to use such an expression, demand that inspiration and expiration for vowels should follow one another in such a manner as to enable them to embrace the consonants with ease, and to carry them along with a graceful movement.

This is what is called the cadence, the rhythmical modulation of the voice. It is, therefore, necessary that consonants should follow one another in such a manner that these "ethics" can be successfully carried out.

An ingoing consonant should follow one that is outgoing, and vice versa; and a mute should always be embraced between two semi-vowels, or two vowels, or a semi-vowel and a vowel. Persons, whose style is good, or who write good poetry, follow this rule instinctively. Those who write a bad or hard style, sin against it continually.

The fact is, that each word by itself, with very rare exceptions, is constructed in strict conformity with this rule. It is by joining one word on to another, not in harmony therewith —that is, one for which we do not breathe in proper sequence with the preceding or succeeding

one—that the most flagrant sins against style or rhythm are committed.

The law underlying it all is the one which makes breathing for speech easy. As soon as there is a demand made on the voice for either too many expirations or too many inspirations following each other in close succession, and without giving the speaker an opportunity to recuperate his breath—that is, to bring it back to an equilibrium by restoring the air, which was "held" at the proper time and place—the voice becomes strained, and thus loses its power for uttering rhythmical sounds. This "proper time and place" is at the end of a sentence.

While Helmholtz has given to the world valid reasons for the necessity of musical sounds following one another in certain scales and intervals, to produce harmony in music, no one has, as yet, touched upon the reasons why vocal sounds should follow one another in a given order, to produce music in speech or song.

There is a very important point in connection with consonant sounds which I omitted to mention before. The tip of the tongue, to which

is assigned as important a role in the production of sound as there is to the tip of the fingers for the sensation of feeling, assumes different shapes for the production of various sounds. As a rule, these shapes, for the production of English sounds, are far more positive than they are for German sounds. For the latter, it touches the oral cavity, or the lower gum, but lightly, and does not assume such decided shapes that they could be readily described. To produce correct English speech, this state of indifference is changed into one of decided energy. To produce the *k* sound, it comes to a sharp point, something like the toes of a dancer, when resting her entire body on the same. After this shape has been assumed, it "kicks" the floor of the mouth for inspiration and again its roof for expiration, with a quick but very positive movement.

For *r*, although it retains this shape, it is more relaxed, and *trails* along the roof of the mouth for expiration, and along its floor for inspiration.

For *l* the tongue's tip is less rigid still, and

its shape is somewhat bent; for the lower sound, it is bent upward; for the upper, downward.

For *m* it is bent down for both sounds, while its entire front takes a firm hold in the ring of the palate for the expired sound, and again in that of the lower gum for the inspired sound.

The same shape of the tip of the tongue prevails for *n*, *t*, *p*.

The less strain there is on a sound, the more relaxed will be the tip of the tongue. This is a point to which foreigners must pay attention, if they want to produce English sounds with that energy which is so characteristic of them.

The main reason for the various shapes assumed by the tip of the tongue is to enable the front of the tongue to become firmly sealed against the wall of the oral cavity, and thus to create an air-tight compartment previous to an explosion of air for sounds which are to be loud and positive. For weaker sounds, this hold is more or less relaxed.

SOUND AND NERVES.

DOES this impact, of which I have just spoken, not mean more, however, than simply a mechanical action to concentrate the air above or beneath the tongue's tip, which, upon being released, creates an explosion? Would that and the other mechanical actions of which I have spoken suffice in bringing about all the shadings of the consonant sounds?

And who would seriously want to say that these sounds are, in reality, nothing but noises, that there is no soul in them?

Is it necessary to give examples? Every word spoken with an emphasis will show to the contrary. For is there nothing in the *th* or *n* in "thunder," when used as an exclamation of surprise or impatience? or in the *l* of "love," when addressing your bride, etc.?

While I concede to the vowels the first place in conveying the meaning of our soul, the consonants are by no means devoid of such meaning.

I have heretofore spoken of the "air-channels" into which, by mechanical means, the "air-sparks," as I call them, are drawn—those swift, meteoric currents of air which produce sound—not only sounds, so called, as represented by a note or a letter, but all the ramifications of sounds connected with each of these sounds. Each ramification represents one of these sparks, purposely inspired, or expired for the same. Their action is so swift, and, at the same time, so irregular, that it would be necessary to invent a new mode of counting time, should we be called upon to give an account of it.

Just what the air-passages are, into which the air-sparks are drawn, or from which they emerge, I cannot say, nor how the air reaches them through the trachea or the œsophagus. I am of the opinion, however, that they are diffused throughout a large area of our body, the same almost as the nerves are. They stand in intimate relation to the latter. Thus only can we account for the emotional nature of our voice.

They are *nerves which become audible*, when the air they contain is set in motion, or, more properly speaking, perhaps, when a stream of air is passed through them. This might be modified again by saying that there are nerves through whose action a particular air-channel is expanded or contracted. These nerves, while so acting, at the same time impart to the sound, thereby created, its spiritual, emotional character.

There are knots in which these sound-nerves centre, and it is not impossible that one of these may be located between the eyes, where it is supposed by many that the "voice comes from."

There are other knots, but I am not yet prepared to speak of them with sufficient intelligence.

The "air-channels and nerves" are of so subtle a nature that their very existence has so far eluded the close scrutiny of investigators. It seems, though, as if the nerves which carry the intelligence, and those which enable us to hear, come to a focus at the tip of the tongue, from which, as messengers from the brain and the ear,

they impart their missives by impact to certain points of the palate, whispering to them what they must do. The instant the tip of the tongue touches these points, the nerves ending there carry out these commands.

All this relates to the consonant sounds. But how about the vowels? There being no impact, how is the intelligence imparted for them? I cannot even venture to guess. That the nerves for them centre in the vocal cord and lip, I feel well assured; and I can only assume, in default of any mechanical action, that there are agents at work even subtler than the nerves which act as mediators between them and the mind, as well as our power of hearing.

While we draw the air into the air-channels mechanically, it is not thence converted into sound without the interference of the sound-nerves, which give character to the sound, as, of course, no mere mechanical action would be able to do.

It is a great mistake, therefore, when speaking of the voice, to say: "It is simply a musical instrument *like any other.*" "Simple," in-

deed! Even mechanically speaking, it is not one but a dozen instruments fused into one, and possessing the main qualities of all these. When it comes to the higher qualities, however, those imparted to it by the soul, we stand, as ever, before an inscrutable mystery.

Our attempts at creating sounds by musical instruments, though these sounds may be pleasing to our ear (so is a painted landscape to our eye) as compared with the voice, are but of a crude nature, both as to the manner of their production and as to the product itself, even though from a mere artistic standpoint they may reach the highest point of excellence.

I am not as yet prepared to enter the field in explanation of the vowel sounds, and their relation to the construction of the consonant sounds, with sufficient intelligence to do so at the present moment. I am already in possession of a good deal of material, however, as a basis for such an exposition, and I shall endeavor to bring it into shape, as soon as I shall be able to do so. Meantime, I have thought it best to publish what I have already written out, having waited

a great many years before I thought I had sufficient light on the subject to venture out with it.

This, I trust, will be of some benefit, though there is still much to be said, which is of importance to the better understanding and development of the voice.

In this connection I beg to mention with grateful acknowledgment that Mr. Edgar S. Werner, from the very beginning of my acquaintance with him, has listened to the recital of my investigations with the most appreciative kindness. It is also with his advice and consent, that I have postponed the publication of the rest of my investigations until they shall have attained a more perfect shape than they have at the time of this writing.

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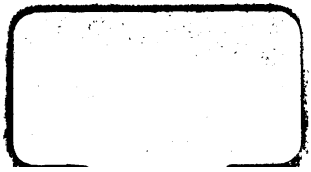

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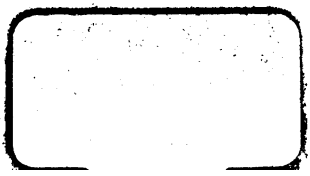
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